USFS SNRA HEADQUARTERS BUILDING (PWS 5070072)
SOURCE WATER ASSESSMENT FINAL REPORT

December 28, 2000

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for the USFS SNRA Headquarters Building, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The USFS SNRA Headquarters Building drinking water system consists of one well. Due to a moderate rating in hydrologic sensitivity and the small number of potential contaminant sources, the well ranks as moderate susceptibility to inorganic contamination, volatile organic contamination, synthetic organic contamination, and microbial contaminants. Total coliform bacteria and synthetic organic contaminants have never been detected in the well water. In November 1999, water chemistry tests showed the presence of the volatile organic contaminant toluene. The inorganic contaminants beryllium, fluoride, and nitrate have been detected, although below the Maximum Contaminant Level for drinking water. The delineation capture zones include three gold mines, two lead mines, two zinc mines, and the North Fork of the Big Wood River.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the USFS SNRA Headquarters Building, source water protection activities should focus on implementation of the recommendations suggested in the 1995 Sanitary Survey. The source of toluene should be discovered and dealt with. Some of the designated areas may be outside the direct jurisdiction of the USFS SNRA Headquarters Building. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of groundwater, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for mining should be coordinated with the appropriate State and/or Federal agencies responsible for the regulation or cleanup of the mine. Depending on the nature and status of the mine, various agencies could include the Idaho Department of Environmental Quality, the Environmental Protection Agency, the Department of Lands, the Bureau of Land Management, the Forest Service, or others.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR USFS SNRA HEADQUARTERS BUILDING, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (IDEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. IDEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The USFS SNRA Headquarters Building is a non-community non-transient system located in Blaine County, north of the City of Ketchum, near the confluence of Murdock Creek and the North Fork of the Big Wood River (Figure 1), which serves approximately 50 people, through four connections. The public drinking water system for the USFS SNRA Headquarters Building is comprised of one well.

The primary water quality issue currently facing USFS SNRA Headquarters Building is that of the volatile organic contaminant (VOC) toluene. No detections of bacteria or synthetic organic contaminants (SOCs) have ever been made.

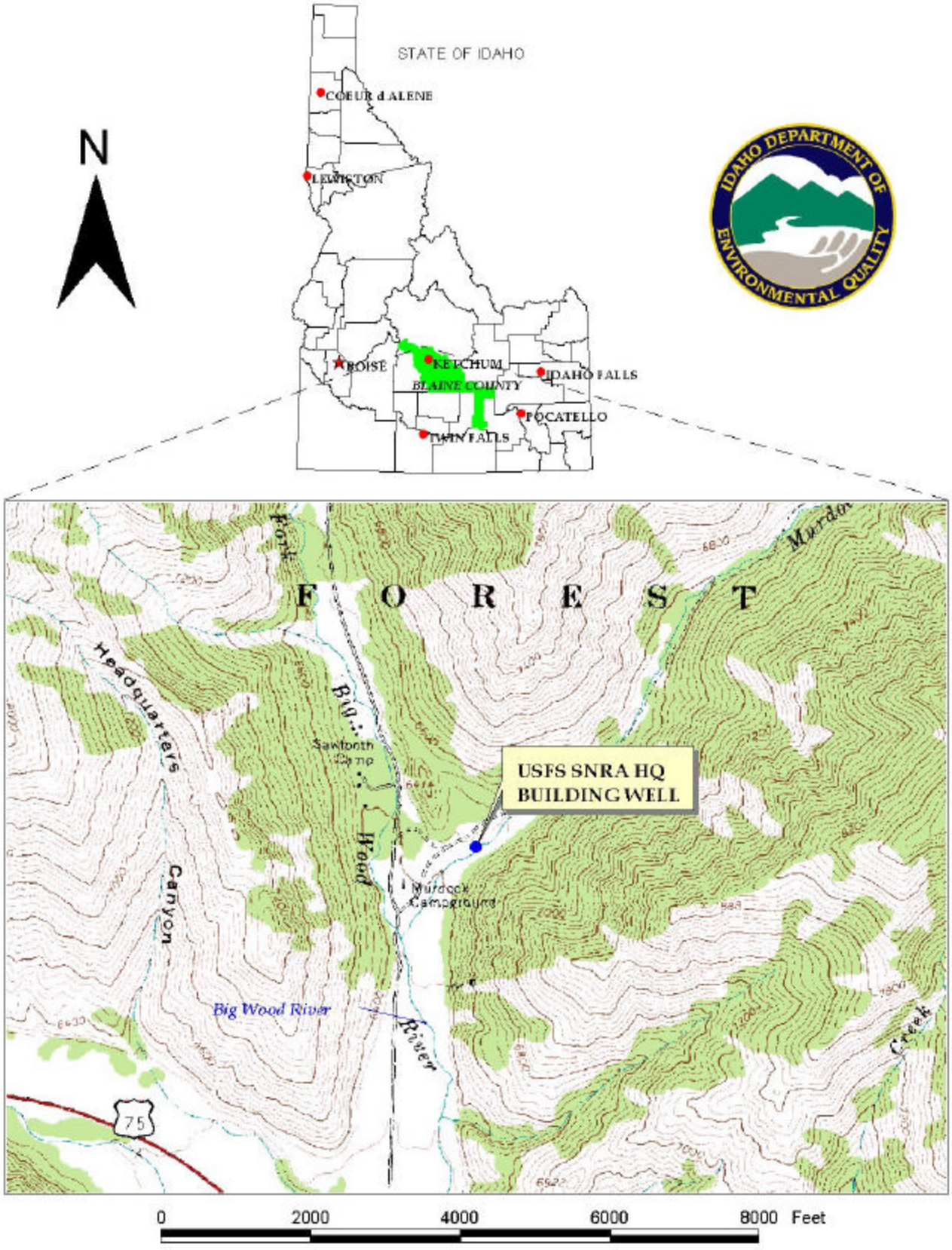
Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. IDEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time of travel for water associated with the Big Wood River aquifer in the vicinity of the USFS SNRA Headquarters Building. The computer model used site specific data, assimilated by IDEQ from a variety of sources including the USFS SNRA Headquarters Building well log, local area well logs, and various reports (Castelin and Winner, 1975; Frenzel, 1989). The USFS SNRA Headquarters Building well delineation can best be described as encompassing the valley floor of the North Fork of the Big Wood River and the watershed above the wellhead. The actual data used by IDEQ in determining the source water assessment delineation area is available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by IDEQ and from available databases.

FIGURE 1 - Geographic Location of USFS SNRA Headquarters Building



The dominant land uses outside the USFS SNRA Headquarters Building area are mining, recreation, small businesses, and undeveloped woodland. Land use within the immediate area of the wellhead consists of undeveloped woodland and recreational facilities.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination. These involve educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during the spring and summer of 2000. The first phase involved identifying and documenting potential contaminant sources within the USFS SNRA Headquarters Building Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by IDEQ. The second or enhanced phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of John Bokor of Idaho Rural Water Association.

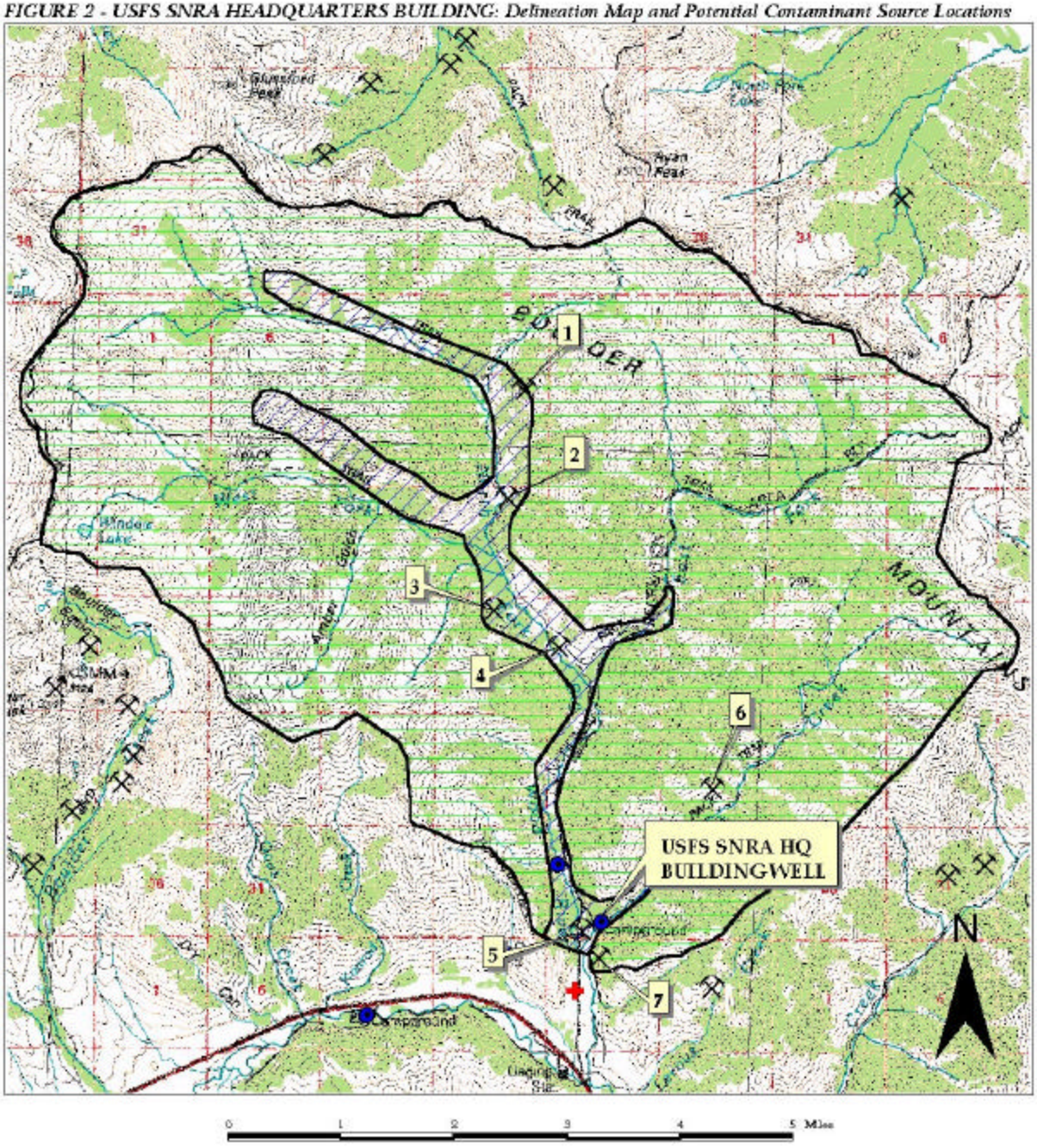
The USFS SNRA Headquarters Building well has a total of seven potential contaminant sites and one additional potential contaminant sources within the delineated source water area (see Table 1). They consist of three gold mines, two lead mines, two zinc mines, and the North Fork of the Big Wood River. The mines are located in various areas of the Big Wood River valley (Figure 2). Since the groundwater aquifer is hydraulically connected to the surface water system (Luttrell and Brockway, 1984), the North Fork of the Big Wood River will be considered a potential source for all types of contamination.

Table 1. USFS SNRA Headquarters Building, Potential Contaminant Inventory

SITE #	Source Description	TOT Zone (years)	Source of Information	Potential Contaminants
1	Zinc Mine	0-3	Database Search	IOC
2	Zinc Mine	0-3	Database Search	IOC
3	Lead Mine	0-3	Database Search	IOC
4	Gold Mine	0-3	Database Search	IOC
5	Gold Mine	0-3	Database Search	IOC
6	Gold Mine	6-10	Database Search	IOC
7	Lead Mine	6-10	Database Search	IOC
	Big Wood River	0-10	Database Search	IOC, VOC, SOC, Microbes

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

FIGURE 2 - USFS SNRA HEADQUARTERS BUILDING: Delineation Map and Potential Contaminant Source Locations



PWS# 5070072
WELL

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was rated moderate for the USFS SNRA Headquarters Building drinking water system (see Table 2). Multiple factors affect the likelihood of movement of contaminants from the surface to the groundwater. The soils within the delineation are classified as poorly drained to moderately drained, which reduces the downward movement of contaminants. The USFS SNRA Headquarters Building well log shows that the vadose zones (zone from land surface to the water table) is made up of cemented boulders, which could reduce the downward movement of contaminants. However, the water table is just 26 feet below ground surface (bgs), which does not allow for much filtration before a contaminant reaches the groundwater.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. The USFS SNRA Headquarters Building drinking water system consists of one well that extracts groundwater for recreation and small business uses. The well was drilled to 125 feet bgs into black sediment. The water table was identified at 26 feet bgs. Six-inch steel casing was installed from ground surface to 125 feet bgs. The well screen was installed from 55 feet bgs to 64 feet bgs.

The well system construction score was rated high (Table 2). A Sanitary Survey completed in 1995 showed that the wellhead and sanitary seals needed improvement to provide adequate protection to the groundwater. The report also showed that the well was protected from surface flooding.

Though the well may have been in compliance with standards when it was drilled in 1973, current Idaho Department of Water Resources (IDWR) public water system (PWS) well construction standards are more stringent. The IDWR Well Construction Standards Rules (1993) require all PWSs to follow IDEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the Recommended Standards for Water Works (1997) during construction. Table 1 of the Recommended Standards for Water Works (1997) states that 6-inch casing requires a thickness of 0.280 inches (the USFS SNRA Headquarters Building well meets this requirement). The casing and annular seal of a PWS well must both be installed into low permeability units to protect the groundwater source. The USFS SNRA Headquarters Building well log shows that the casing does not extend into a low permeability unit. No information is available as to the depth of the annular seal. Additionally, Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last "24 hours or until stabilized drawdown has continued for six hours at 1.5 times" the design pumping rate.

Based on nearby well logs and previous studies of the area (Castelin and Winner, 1975; Frenzel, 1989; Brickway and Kahlown, 1994), the USFS SNRA Headquarters Building well is most likely completed in the fluvioglacial (river and glacier deposited) sediments comprises of fine to coarse-grained gravel that have considerable quantities of water available for use.

Potential Contaminant Source and Land Use

The USFS SNRA Headquarters Building well rated moderate for inorganic chemicals (IOCs) (e.g., nitrate, lead), and low for synthetic organic chemicals (SOCs) (e.g., pesticides), volatile organic chemicals (VOCs) (e.g., petroleum products), and microbial contaminants. The majority of the IOC points came from the seven mines in the delineation area. Points for SOCs, VOCs, and microbial contamination came from the presence of the North Fork of the Big Wood River in the delineation area.

Final Susceptibility Ranking

Detections above drinking water standard Maximum Contaminant Levels (MCLs) or a detection of a VOC or SOC will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. In the case of the USFS SNRA Headquarters Building Well, an automatic high score was given for VOCs because toluene was detected in November 1999. In terms of total susceptibility rating, the well rates moderate for all other types of contaminants.

Table 2. Summary of USFS SNRA Headquarters Building Susceptibility Evaluation

Well	Susceptibility Scores									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well	M	M	L	L	L	H	M	H*	M	M

H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Indicates source automatically scored as high susceptibility due to presence of the VOC toluene in the tested drinking water.

Susceptibility Summary

The VOC toluene possibly threatens the USFS SNRA Headquarters Building drinking water system. The USFS SNRA Headquarters Building should also be aware of the possible IOC contaminants that exist due to the mining uses in the area.

The well in the USFS SNRA Headquarters Building system takes water from the alluvial (river deposited) aquifer that comprises the Big Wood River valley floor. The valley floor ½ mile to 1-½ miles in width. The depth of the valley fill in the area of the USFS SNRA Headquarters Building is greater than 100 feet below land surface (Castelin and Winner, 1975). The groundwater and surface water systems are hydraulically

connected and the hydraulic potential within the aquifer does not vary greatly. Recharge is primarily from precipitation, tributary valley underflow, and canal and stream seepage losses (Luttrell and Brockway, 1984). Water quality problems have been attributed to sewage treatment facilities, mining, construction, and agriculture (Castelin and Winner, 1975).

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the USFS SNRA Headquarters Building, source water protection activities should focus on implementation of the recommendations suggested in the 1995 Sanitary Survey. The source of toluene should be discovered and dealt with. Continued vigilance in keeping the wells protected from surface flooding can also keep the potential for contamination reduced. With the direct connection between the surface water and groundwater systems, any surface water discharges to the North Fork of the Big Wood River should be adequately monitored. There is the potential for mine discharges affecting the local water wells. Though agricultural activities are currently not a major land use, the highly permeable nature of the soils and the movement rates of the water through the aquifer could make agricultural chemical leaching a concern. The USFS SNRA Headquarters Building should consider implementing practices aimed at reducing the leaching of agricultural chemicals from any usage within the delineated source water areas.

Some of the delineated areas may be outside the direct jurisdiction of the USFS SNRA Headquarters Building. Partnerships with state and local agricultural agencies, county elected officials, and industry groups should be established and are critical to success. Due to the time involved with the movement of groundwater, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for mining should be coordinated with the appropriate State and/or Federal agencies responsible for the regulation or cleanup of the mine. Depending on the nature and status of the mine, various agencies could include IDEQ, EPA, the Department of Lands, the Bureau of Land Management, the Forest Service, or others.

Assistance

Public water supplies and others may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Twin Falls Regional IDEQ Office (208) 736-2190

State IDEQ Office (208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 743-6142 for assistance with wellhead protection strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (IDEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by IDEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Anderson, J.E. and K. Bideganeta. 1985. "A Preliminary Geologic Reconnaissance of the Geothermal Occurrences of the Wood River Drainage Area." Water Information Bulletin No. 30. Idaho Department of Water Resources. 49 pages.

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Attachment A

USFS SNRA Headquarters Building Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : USFS SNRA HEAD QUARTERS BLDG Well# : WELL

Public Water System Number 5070072 09/28/2000 1:09:12 PM

1. System Construction		SCORE				
Drill Date	09/30/1973					
Driller Log Available	YES					
Sanitary Survey (if yes, indicate date of last survey)	YES	1995				
Well meets IDWR construction standards	NO	1				
Wellhead and surface seal maintained	NO	1				
Casing and annular seal extend to low permeability unit	NO	2				
Highest production 100 feet below static water level	NO	1				
Well located outside the 100 year flood plain	YES	0				
Total System Construction Score		5				

2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	YES	0				
Vadose zone composed of gravel, fractured rock or unknown	NO	0				
Depth to first water > 300 feet	NO	1				
Aquitard present with > 50 feet cumulative thickness	NO	2				
Total Hydrologic Score		3				

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	YES	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	6	1	1	1
(Score = # Sources X 2) 8 Points Maximum		8	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
4 Points Maximum		1	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		9	2	2	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	

Total Potential Contaminant Source / Land Use Score - Zone III	2	0	0	0
Cumulative Potential Contaminant / Land Use Score	11	2	2	2
4. Final Susceptibility Source Score	10	8	8	9
5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate